ORNITHOLOGY

Project title: Aspen–Migratory Bird Relationships in the Northern Yellowstone Ecosystem

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Objective: Our objective is to determine the relationships of aspen patch characteristics and stand composition with migratory and resident birds. Previous research at lower elevations in the western United States suggests that migratory birds may respond to patch level attributes of aspen stands when settling on their breeding range. Specific objectives include determining whether the relationships found between patch characteristics and breeding bird abundance at lower elevations occur more widely and the effect of conifer invasion of aspen stands on bird diversity. We measured several patch-level and within-patch characteristics of 30 aspen patches throughout the northern ungulate range and surveyed birds using point counts.

Findings: The first of two field seasons yielded 1,129 observations of 46 species of birds, the majority of which are Passerine migrants. The basal areas of aspen and conifer, canopy covers of aspen and conifer, dominant understory vegetation, area, perimeter, elevation, azimuthal orientation of major axis, and matrix context of each aspen patch were measured. Analysis of relationships between patch characteristics and bird abundance and species richness is planned after the next (2002) field season.

Project title: Relating Avian and Herptilian Abundance and Diversity to Human Disturbance Regimes

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Objective: 1) Identify areas of significant avian abundance and diversity within riparian zones on

the Northern Range. 2) Identify areas supporting amphibian breeding, foraging, and dispersal activities within riparian zones on the Northern Range. 3) Characterize above areas through habitat and environmental description at local and drainage scales in order to relate to patterns in avian species assemblages and herptile (amphibian) breeding and foraging sites. 4) Relate diversity and abundance patterns to anthropogenic disturbance regimes within and between drainages.

Findings: During our second year of field investigations we sampled 387 point count plots for birds yielding over 5000 individuals comprising over 100 species. Like year 2000, the most numerous passerines detected within 100 m on point counts were Cliff Swallows *(Petrochelidon pyrrhonata)* owing to their gregarious nature, American Robins *(Turdus migratorius)*, and Savannah Sparrows *(Passerculus sandwichensis)*. Savannah Sparrows were found in sedge *(Carex sp.)*-dominated areas whereas at the other end of the vegetation gradient, Lincoln's Sparrows *(Melospiza lincolnii)* were consistently found in willow *(Salix spp.)* stands. Warblers were absent from most sites exclusive of high elevation willow sites and those sites where willows were a major component of the vegetation. Notably, one male Harlequin Duck was encountered on our avian point counts.

Thus far, we have identified significant drainage effects upon levels of riparian bird community diversity and abundance. Bird abundance, species richness, and diversity were positively related to willow abundance but showed varying patterns between drainages on the Northern Range. Avian diversity at sites within YNP fall midway within the range exhibited by sites outside of YNP but within the Northern Range.

We are refining measures to more accurately describe species replacements associated with habitat features such as basin characteristics, floodplain size, and riparian shrub height and density. Development of an Index of Biotic Integrity (aka., Bird Integrity Index) relating specifically to shrub-dependent passerines is ongoing. Such methodology shows promise in characterizing the riparian 'health' of stream reaches that may be decoupled from aquatic chemistry profiles.

These same drainages have been surveyed for amphibians and reptiles identifying another previously unknown boreal toad *(Bufo boreas)* breeding site as well as breeding sites of Columbia spotted frogs *(Rana lutieventris)* and boreal chorus frogs *(Pseudacris maculata)*. The boreal toad breeding site identified in 2000 was occupied and successfully produced metamorphs in 2001. Moreover, we identified areas that appeared to harbor young toads through the winter, as we encountered them as they moved along water bodies in early season.

Project title: Movements and Survival of Bald Eagles Banded in Yellowstone National Park

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Objective: Movements and survival of bald eagles produced in Yellowstone National Park, including nestling gender assignment methods and environmental contaminant loads in tissue.

Findings: Four nestling bald eagles banded in YNP in 2001, and blood samples for DDT analysis and DNA gender assignment obtained from two.